Title: "Fractions for You and Me"

Brief Overview:

Throughout this unit, students will explore the themes of fractions and families. Students will discover how fractions, like families, represent parts of a whole. Through a literature-based curriculum and kinesthetic activities, students will listen to stories and answer key questions concerning fraction-related concepts. They will participate in many kinesthetic and tactile activities, including the production of fraction family homes.

NCTM 2000 Principles for School Mathematics:

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

- **Content Standards**

<u>Number and Operations</u>

- Understand and represent commonly used fractions such as 1/4, 1/3, and 1/2.
- Develop understanding of fractions as part of unit wholes, and as parts of a collection.
- Use models and benchmarks to judge the size of fractions.

- **Process Standards**

<u>Problem Solving</u>

- Use information to identify and define the question(s) within a problem.
- Select and then apply appropriate problem-solving strategies (draw a picture and guess and check).
- Apply what was learned to a new problem.

Reasoning and Proof

- Justify why an answer or approach to a problem is reasonable.
- Make predictions or draw conclusions from available information.

Communication

- Represent problem situations and express their solutions using pictorial methods.
- Use mathematical language and symbolism appropriately.
- Present results in written form.

Connections

- Identify and use the relationships among mathematical concepts as a basis for learning additional concepts (3rd grade).
- Identify mathematical concepts and processes as they apply to other content areas.
- Use mathematical concepts and processes to translate personal experiences into mathematical language.

Representation

- Create and use representations to organize, record, and communicate mathematical ideas.

***Underlying themes in this unit include: community, family, and character education.**

Grade/Level:

2-3 (inclusion)

Duration/Length:

3-5 days depending on grade level and schedule (block vs. flexible)

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Identifying fractions (1/2, 1/3, 1/4, etc.)
- Constructing fractions (3rd grade)
- Recognizing parts of a set
- Understanding fair shares
- Identifying strategies for basic problem solving

Student Outcomes:

Students will:

- Work collaboratively and individually.
- Understand and demonstrate knowledge of fractional parts of a whole and a set.

- Write to inform.
- Gather and record data.
- Use manipulatives to find solutions to everyday problems.
- Communicate findings orally and in writing.

Materials/Resources/Printed Materials:

- Books: The Doorbell Rang by Pat Hutchins, and The Big Orange Splot, by Daniel Pinkwater
- Student Resource Sheets #1-3, Teacher Resource sheet #1, Project Resource sheets #1-2.
- Manipulatives: fraction circles, hand-made number cards.
- Computers (Kid Pix Deluxe) or construction paper, scissors, glue, rulers.
- Math journals
- Optional: small wipe-off or chalkboards

Development/Procedures:

Day One

Materials

- Book: The Doorbell Rang by Pat Hutchins
- Hand-made manipulatives ("cookies") or Fraction Circles
- 1 copy for each student of **Student Resource Sheet # 1** (*fraction circles may be used).
- For homework: **Project Resource Sheet # 1** and **Project Resource Sheet # 2**. Use **Teacher Resource Sheet # 1** to create your own fractions for the children to use with the project.

Introduction

- Ask key questions: **Have you ever had to share a treat with your friends or family?**
  What would you do if there were more treats than children?
  What would you do if there were more children than treats?
- Have children answer questions orally or in math journals.
- Read The Doorbell Rang, by Pat Hutchins.
- Review the premise of the story and segue in to activity.

Activity

- Re-enact the story using fraction circles or other types of "cookies". Each cookie should be the same shape and same size.
- Children should work collaboratively in small groups, while the teacher re-reads the story. The teacher should pause periodically to review the number of cookies each child has after a new child enters Sam and Victoria's house. The teacher should make sure that the children notice that their personal cookie supply is dwindling, while the total number of cookies remains the same.
- During this time, the teacher will introduce the concept of the ***denominator***—the total number of cookies, and the ***numerator***—the number of cookies each child has. Display these fractions on the overhead or board.
- Once most children have mastered these concepts, the teacher may move onto the extension activity (**Student Resource Sheet # 1**).

Assessment

- Students are assessed through teacher observations and their performance on **Student Resource Sheet # 1**. See **Teacher Resource Sheet # 2** for the answers.

Day Two

Materials

- Book: The Big Orange Splot, by Daniel Pinkwater
- **Student Resource Sheet # 2** and **Student Resource Sheet # 3**
- Computer: Kid Pix Deluxe or construction paper, scissors, glue, and ruler.

Introduction

- Picture walk through The Big Orange Splot. Ask students to describe what they see.
- Read The Big Orange Splot to the class.
- Throughout the story, discuss and ask key questions.
  Go back to different parts of the story (as more neighbors change their houses) and ask what fraction of the houses are the same, and what has changed about the houses. Discuss the answers using fraction terminology. **"What part of this house is now purple?"**
- Discuss what you learned about each person because of the way he designed his house.

Activity

- See **Student Resource Sheet # 2**. Students will use this page to create their own fraction house, which will show characteristics of the child and his/her family. Have students use self-assessment checklist on the second half of the page.
- Students will write to inform about their fraction house and what it represents. Use checklist on Student Resource Sheet # 2 as a guide to write their paragraphs. Remind students to use fraction terms that are on the board from yesterday. (You can do this activity during Writing Workshop (LA), centers, or as an additional journal warm-up activity).

Assessment

- Students will display his or her fraction home and read his/her paragraph in order to explain the home to the class. The teacher may use the self-assessment as a guide for grading.

Day Three

Materials

- **Project Resource Sheet # 2**
- Large number card with one-digit numbers written on each card. (*or two-digit numbers depending on ability)

Introduction

- Begin math class by allowing students to share results of the "detective work" from **Project Resource Sheet #2**.

Activity

- Game: (**Fraction Frenzy)** Each student receives a different number from the teacher that is written clearly on a large piece of paper. It can be a single or double digit number depending on ability. The teacher then explains that she/he will call out a fraction, and the students are to come up to the front of the class in order to form the fraction—only if they have the correct numerator or denominator. The teacher acts as the fraction bar.

- The students, at their seats, need to write the fraction correctly in their math journals, and draw a picture representing the fraction. (small chalkboards/wipe-off boards work well, too).

Assessment

- Students are assessed through teacher observations as they participate in the Fraction Frenzy game, and through their performance concerning their detective work.

Performance Assessment:

This unit provides ongoing assessment, which is provided through the following activities: continuous teacher observation, accuracy in completing student resource pages, proper completion of fraction homes, written responses, and proactive participation in the game.

Extension/Follow Up:

Students can use geoboards and different colored rubber bands to create a framework for their homes. Students (who require a bit of a challenge) can build their homes out of tangrams, in addition to determining the fractional part of each shape in the tangram.
There are several other math/literature connections, too. Read the following stories:
Fraction Action, by Loreen Leedy, Fraction Fun, by David Adler, Give Me Half, by Stuart Murphy, Eating Fractions, by Bruce McMillan, or The Hershey's Milk Chocolate Bar Fractions Book, by Jerry Palotta.

Authors:

Jennifer Hertzberg
Westbriar Elementary School
Fairfax County Public Schools, VA

Sandy Andrews
Delmar Elementary School
Wicomico County Public Schools, MD

Name: _____ Student Resource Sheet #1

Date: _____

"Getting a Fair Share"

1.) Based on the story, The Doorbell Rang, when 4 children had to share the 12 cookies, how many cookies did each child get? _____

What fraction of the cookies did each child have? (Remember to use the correct number as the numerator and as the denominator) _____

2.) You **and** your 2 friends would like to share a small pizza. A small pizza has 6 slices. How many sixths do each of you receive? Write the fraction and explain your answer. _____

_____

_____

3.) You and a friend are sharing a box of eight crayons equally. What fraction of the crayons will you get to use? Explain your answer. _____

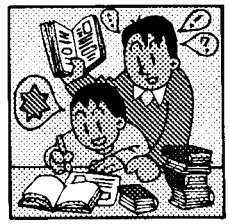
_____

_____

4.) Five friends shared ten pieces of candy equally. Which fraction of the candy did each friend receive? Circle the correct answers and draw an array to prove your thinking.

1/4 1/5 2/3 2/10 1/3 5/10

"Fraction Detectives"



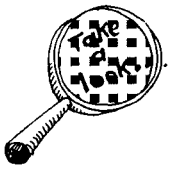
Dear Parents,

We have begun a unit on fractions, and are now learning how to identify what a fraction might look like. As part of your child's homework this week, each student will be given a different fraction daily, to explore and find examples of within his/her home. Each child is to submit their "Detective Work" chart on _____, when we will review the different examples in class. Help your child be as creative as possible. Fractions can be found in the most unusual places!

Sincerely,

Name :_____ Project Due: _____

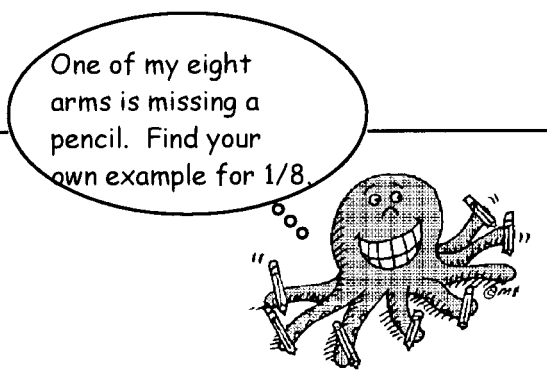
Project Resource Sheet #2



"Fraction Detectives"

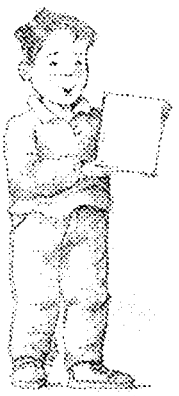
Draw and label a picture or write an example for each fraction you are given.

$\frac{1}{2}$	
_____	
_____	
_____	
$\frac{1}{8}$	

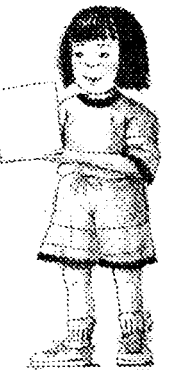


Teacher Resource Sheet #1

1 — 2	1 — 8	—
—	—	—
—	—	—



"Fractions About Families":
Building homes to represent what is in our hearts.



The home you create will represent your family—the number of people and pets, including your own unique personality. You will be using Kid Pix Deluxe or construction paper to construct your design. Use the following checklist to make sure that you include all of the important characteristics.

_____ Number of family members= the number of windows

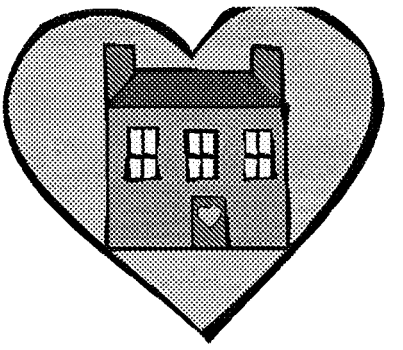
_____ Color one window pink for each girl.

_____ Color one window blue for each boy.

_____ Choose a shape to represent your age.
For example, if you are eight, you could include eight congruent triangles on your house. (all the same shape and size)

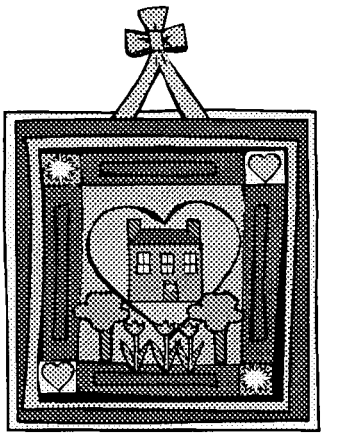
_____ If you have pets, divide your door into equal sections which represent the number of pets you have. For example, if you have two pets, your door should be divided in half. If you have no pets, you should color the door of your house blue. Try using a different color other than blue, if you have pets.

_____ If you wish, you can divide your house into equal sections that represent something important about your family. Use patterns to cover each section. For example, 1/5 of your house could be covered



Name: _____

Date: _____



Student Resource Sheet #3

Use your checklist and the home that you created to write about your family using fraction terms.

Teacher Resource Sheet # 2

Answer Key

1.) 3 cookies
3/12 or 1/4

2.) 2/6. There are 3 friends who would like to share 6 slices of pizza. Therefore, each friend gets 2 slices of pizza.

3.) 4/8 or ½. There are 2 friends in all, so each friend would get four crayons.

4.) 1/5 and 2/10.